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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/763,315

01/23/2004

Shinya Ito

17381

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23389

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12/28/2005

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EXAMINER

SARKAR, ASOK K

ART UNIT

PAPER NUMBER

2891

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

4-A

Office Action Summary	Application No.		Applicant(s)	
	10/763,315		ITO, SHINYA	
	Examiner		Art Unit	
	Asok K. Sarkar		2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 9-14 is/are withdrawn from consideration.
- 5) ☒ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Claims 1 – 5, 7 and 8 rejected under 35 U. S.C. 102 (b) and 103(a) as being unpatentable for reasons of record in Paper No. 12 are reproduced below:

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 – 5, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Kepler, US 6,100,145.

Regarding claim 1, Kepler teaches a method of fabricating a semiconductor device, comprising:

- (a) forming an oxide film 335 entirely over a semiconductor substrate 300 on which a MOS transistor 315 is fabricated with reference to Fig. 3B ;
- (b) carrying out first thermal – annealing to said semiconductor substrate is inherent step for forming the source/drain regions;
- (c) removing said oxide film 335 in an area where later mentioned semiconductor - metal compound is to be formed with reference to Fig. 3C;
- (d) forming a metal film 345 entirely over said semiconductor substrate with reference to Fig. 3D; and

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- (e) carrying out second thermal – annealing to said semiconductor substrate to form semiconductor – metal compound in said area with reference to Fig. 3F in column 4, lines 25 – 65.

Regarding claim 2, Kepler teaches the method further comprising removing said metal film having been not reacted with said semiconductor substrate in column 5, lines 8 – 12.

Regarding claim 3, Kepler teaches silicon substrate and the compound is a silicide in column 4, lines 25 – 65

Regarding claim 4, Kepler teaches the metal film is cobalt in in column 4, line 55.

Regarding claim 5, Kepler teaches the oxide film is formed by CVD inherently at temperatures of 300 – 500 °C at thickness of 20 – 40 nm in column 4, lines 43 – 47.

Regarding claim 7, Kepler teaches the first thermal-annealing is carried out also for activating impurities' having been implanted into source and drain regions of said MOS transistor, and for removing defects in said source and drain regions and is inherent in the method for forming source/drain regions.

Regarding claim 8, Kepler teaches forming a trench in said semiconductor substrate; and filling said trench with oxide to define an area in which a semiconductor device is to be fabricated with reference to Fig. 3B in column 4, lines 25 – 29.

Regarding claim 15, Kepler teaches STI film 305 with reference to Fig. 3A.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kepler,

US 6,100,145 in view of Huang, 6,413,861 and Jenq, US 6,258,651.

Kepler fails to teach first thermal – annealing is carried out as spike rapid thermal annealing (RTA) by zero second in the range of 1000 to 1100 °C.

Huang teaches RTA in column 1 – 26 for the benefit of activating the dopants to form source/drain regions.

Jenq teaches the temperature for annealing the dopants in the range of near 1000 °C in column 4, lines 55 – 67 for the benefit of activating the dopants to form source/drain regions.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Kepler and perform first thermal – annealing as spike rapid thermal annealing (RTA) by zero second in the range of 1000 to 1100 °C for the benefit of activating the dopants to form source/drain regions as taught by Huang in column 1 – 26 and as taught by Jenq in column 4, lines 55 – 67.

Response to Arguments

7. Applicant's arguments filed December 9, 2005 have been fully considered but they are not persuasive. The Applicant's primary argument is regarding the validity of the 102(b) rejection for claims 1 – 5, 7 and 8 because according to him, the reference fails to teach the first thermal annealing step. The Examiner mentioned (see rejection described above) that the first annealing was inherent in Kepler's process since annealing is performed after the source/drain implantation. The Applicant's argument that the source/drain annealing is done prior to the oxide film deposition pointing to the specification is irrelevant because those are not the limitation of these claims. The rejection is based on the claim limitations. Furthermore, Applicant's assertion in paragraph 2 of page 7 that the reference does not teach annealing step subsequent to deposition of the metal layer is not persuasive and he is referred to the reference's description in column 4, lines 55 – 65.

Conclusion

8. This application contains claims 9 – 14 drawn to an invention nonelected with traverse in Paper filed on August 17, 2005. **A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.**

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

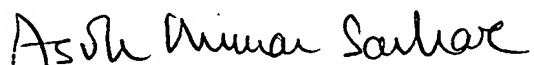
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William B. Baumeister can be reached on 571 272 1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Asok K. Sarkar". The signature is fluid and cursive, with the first name "Asok" being more prominent.

Asok K. Sarkar
December 23, 2005

Primary Examiner